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**AN EVALUATION OF THE SEMANTIC DIFFERENTIAL TECHNIQUE  
AS A TOOL FOR THE DISCRIMINATION AND PREDICTION  
OF EXTRAVERSION-INTROVERSION**

**A Thesis  
Submitted to the Faculty of Graduate Studies through the  
Department of Psychology in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Arts at Assumption  
University of Windsor**

by

**NIKOLAUS TINES, B.A.  
Assumption University of Windsor, 1959**

**Windsor, Ontario, Canada  
1962**

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N. G. G. G.

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R. R. Phillips

## ABSTRACT

The personality traits of Extraversion and Introversion, because of their outstanding and pervasive nature, have received a great deal of attention by research psychologists. Many investigators were concerned with the measurement of these traits. None of their results however, proved adequate from the points of view of either validity or reliability.

As a possible solution to this problem, an approach to the measurement of these traits through the use of the Semantic Differential technique is suggested in this investigation. The Semantic Differential has high reliability and seems to have face validity for the measurement of Extraversion-Introversion. The hypothesis put forth in this investigation is that a satisfactory concurrent (statistical) validity can be obtained for the Semantic Differential as a technique for measuring these traits.

To test this hypothesized validity, the Semantic Differential scores of a group of 43 subjects were analyzed for their capability to discriminate between subjects classified as being either extraverted or introverted on the basis of the recognizable presence of either trait in a set of drawings completed by them and rated according to Elksich's formal criteria of style.

The correlation between Extraversion-Introversion scores predicted on the basis of Semantic Differential intensity scores and actual Extraversion-Introversion scores received by the subjects on the basis of projective criteria was found to be significant beyond the .01 level. The coefficient of multiple determination, i.e. the variance among actual Extraversion-Introversion

scores explained by the Semantic Differential, was found to be .25.

It was concluded, therefore, that the Semantic Differential could effectively discriminate between and predict Extraversion-Introversion.

## **PREFACE**

**The author wishes to express his grateful appreciation to Dr. V.B. Cervin, under whose direction this study was undertaken and whose patient guidance helped in its execution. He is also indebted to Brother Roger Philip, F.S.C., and Dr. R.A. Helling for their efforts in correcting the manuscript and offering many helpful suggestions. Lastly, he thanks the subjects of this study who generously contributed their efforts and time.**

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## CHAPTER I

### INTRODUCTION

It may be observed that in social situations the behavior of some people appears psychologically uninhibited, that of others restricted. Some individuals from earliest childhood seem to be characteristically inhibited. By the time adolescence is passed these behavior patterns frequently seem to be set to such a degree that a fair prediction may be made concerning a person's mode of reaction to other people in social situations.

This phenomenon has been, and still is, given considerable attention by psychologists in general, and personality theorists and social psychologists in particular. Some have assumed that it is or becomes a basic, i.e. general and persistent, mode of individual behavior in, and adjustment to, a variety of social environments. Different names\*, the most familiar perhaps being Jung's (1923) terms Extraversion-Introversion, have been used to describe these modes of reaction. These habitual modes of behavior were thus conceptualized as personality traits.

Extraversion, according to Jung (1923), is characteristic of individuals whose behavior is directed toward, or dependent on, the external world. The extravert is characteristically active and contented when surrounded by people; carried to the neurotic extreme his behavior appears as an irrational

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\*In a comprehensive review of the early theoretical and experimental work done in this area, Guilford (1934) presents an outline of the various terms and definitions most frequently employed to describe Extraversion-Introversion, each depending largely on the theoretical bias of its particular author.

flight from himself into society, where his feelings are acted out. Jung called hysteria the extravert's neurosis.

Introversion on the other hand is characteristic of the individual who is normally contemplative, who enjoys solitude, whose behavior is dependent on, or directed toward, himself, i.e. his inner environment. In its extreme, Introversion represents a flight from external life into the individual's own inner world, where his fantasies tend to become more meaningful to him than objective reality. Jung saw psychasthenia as the introvert's neurosis, and schizophrenia as his psychosis.

Jung did not suggest, however, that all individuals be dichotomously classified as extraverts or introverts, since everyone has both tendencies to some degree, though one generally predominates. In other words it is assumed to be a bi-polar dimension of personality.

Allport (1939) speaks of 'expansion' and 'reclusion' as being the easiest of expressive traits to identify:

Our first meeting with a person gives the clue, and subsequent experience merely confirms our judgements. A person who is expansive projects himself into his social relationships; he talks freely, expresses his opinion frequently, and leaves little doubt as to his views on any subject. The reclusive person finds little to say; he relates his opinion briefly or not at all. He is reticent.

Since these traits are by definition overt in expression, it is not surprising that several studies show them to be the most reliably rated of all the common traits of personality. A garrulous person is almost always garrulous, a 'human clam' is under almost any circumstances hard to pry open. (Allport, 1939).

Allport's description of observed behavior tendencies clearly deals with the same bi-polar dimension previously defined by Jung as Extraversion-Introversion. The names are modified, the concepts however are basically congruent.

Whatever the terminology employed in their description, the rather

outstanding nature of these personality traits, as evidenced by human behavior in general, aroused widespread interest in their investigation. Many of these investigations were concerned with the development of a technique for the measurement of this bi-polar dimension and its specific intensities within the individual, as well as its relationship to other personality traits. These early attempts, however, proved unsuccessful, largely because they were unable adequately to isolate and conceptualize Extraversion-Introversion as an independent personality dimension.

More recently a renewed attempt at measurement and integration of these traits within the framework of personality structure was made by Eysenck (1947). In a review of factorial studies involving these traits, he reports that in the main these early studies agree in finding:

a bi-polar factor variously called 'surgency-desurgency' (Cattell 1946) . . . 'aggressive-inhibitive' (Line 1935), or whatever terms seem appropriate . . . (and) . . . these factors closely agree with one another, as well as our own hysteria-dysthymia (neurotic Extraversion-neurotic Introversion) factor. (Eysenck, 1947, p.55)

Eysenck himself distinguishes three pervasive and relatively independent dimensions in the personality domain, namely Extraversion-Introversion, Neuroticism, and Psychoticism. He places these traits into the context of a theoretical personality theory of, as yet, disputed validity. Further, although he assumes Extraversion-Introversion, as measured by him, to be completely independent of other traits, there is contradictory experimental evidence for this assumption.

The problem of effective measurement of Extraversion-Introversion remains, therefore, unresolved. One of two alternative conclusions could be drawn from these previous failures to isolate these traits as independent personality factors; either,

(i) Extraversion and Introversion are not basic, independent personality traits; or

(ii) The approaches of previous investigators to the measurement of Extraversion-Introversion were inadequate from the points of view of either validity or reliability.

In this investigation it is assumed that it is the second alternative which is correct. Paper and pencil measures of these traits, though quite reliable, are not based upon an adequate concept of Extraversion-Introversion, and do not differentiate Extraversion-Introversion as independent personality traits and, therefore, lack validity for their measurement. Projective techniques on the other hand, though seemingly appropriate, have been shown to lack reliability and are, therefore, equally inadequate for effective measurement of Extraversion-Introversion. Clearly, an effective approach to the measurement of these traits requires that both criteria of validity and reliability be met.

As a possible solution to this problem, an approach to the measurement of these traits through the use of the Semantic Differential technique is suggested in this investigation. The Semantic Differential technique is a combination of controlled association and scaling procedures. The subject is provided:

with a concept to be differentiated and a set of bi-polar adjectival scales against which to do it, his only task being to indicate for each item (pairing of a concept with a scale) the direction of his association and its intensity on a seven-point scale. (Osgood, Suci, & Tannenbaum, 1957, p.20)

The Semantic Differential has high reliability and seems to have face validity for the measurement of Extraversion-Introversion.

The hypothesis put forth in this investigation is that a satisfactory concurrent (statistical) validity (Cronbach, 1960) can be obtained for the Semantic Differential as a technique for measurement of these traits. To test this hypothesized validity, the Semantic Differential scores of a group of subjects were

analysed for their capability to discriminate between subjects classified as being either extraverted or introverted on the basis of the recognizable presence of either trait in a set of drawings completed by them and rated according to Elksch's (1945) formal criteria of style.

The purpose of this study then is to investigate the validity of the Semantic Differential technique as the tool for measuring Extraversion-Introversion traits of individuals.

## CHAPTER II

### THE PROBLEM OF MEASUREMENT

#### The Paper and Pencil Test Approach

(1) Early Developments. For a number of years after Jung's formulation of Extraversion-Introversion these concepts enjoyed much popularity among psychologists of that period. Their popularity in turn brought about a flood of research concerned with their isolation, measurement, and especially their relationship to other personality variables, (Allport, 1939; Allport & Vernon 1939; Bernreuter, 1933 (a) & (b); Conklin 1923, 1927; Downey, 1924; Freyd, 1924; Guilford, 1934; Guthrie, 1927; Heidebreder, 1926, 1927; Laird, 1925; Lembke, 1930; et al.).

The majority of these early studies were concerned with the relationship between Extraversion-Introversion and other personality variables such as intelligence (Freyd, 1924), sex (Heidebreder, 1926; Laird, 1925), and particularly neuroticism (Bernreuter, 1933; Conklin, 1927; Moore, 1934). Their results, however, often directly conflict with each other.

Laird (1925), for example, reports such a greater tendency toward Introversion in women than in men that he finds it necessary to assign different percentile scores to the two sexes.

Heidebreder (1927), on the other hand, found no differences between men and women in respect to Extraversion-Introversion tendencies. She also cites another study on the same problem conducted at the University of Minnesota prior to hers, using practically the same scale items (Freyd, 1924) as used by

Laird (1925) in his inventory and the same type of subject (college students) and with only minor differences in their respective proceedings. The results of this study also indicated sex differences to be negligible in determining an individual's position on an Extraversion-Introversion scale.

Investigations into the relationship between Extraversion-Introversion and neuroticism produced similarly conflicting results. Moore and Steel (1934), and Bernreuter (1933) have found such high correlations between Introversion and neuroticism that Bernreuter (1933a) concludes the two are not distinct concepts, but are "names given to a single trait whose real nature has been obscured by inadequacies of the tests by which they have been estimated." (p.402)

Conklin (1923), however, attributes this confusion to the fact that most of these early investigators failed clearly to conceptualize the differential nature of Extraversion-Introversion as basic personality traits on the one hand, and their abnormal manifestations in neuroticism, on the other. Their scales, therefore, more often than not were designed to measure the abnormal manifestations of these traits.

Collier and Emch (1957) agree with Conklin and point out that this considerable confusion as to the definition of the traits stems from the fact that the various authors of these definitions retained the terms Extraversion-Introversion, while ignoring the main lines of Jung's arguments in favor of their own theoretical preferences.

The most frequent variety of definition is based on Freud's (1920) adoption of the term Introversion, according to which it is one of the invariable and indispensable considerations in every case of psycho-neurosis - a substitution for actual objects of phantasies of these objects, (1920). According to Collier and Emch "Freud's definition of the term represents a rigid contraction both in

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meaning and in use." (1938, p.1047)

Similar contradictions are evident in the results of other early studies correlating these traits with various personality variables. A comprehensive review of such studies is presented by Guilford (1934).

The general confusion in the early development of this area prompted Guthrie (1927, p.83) to conclude that "in most of the accounts of introversion and extraversion, evidence of the existence of these types or of the measurement of their degrees is conspicuously absent." This seems almost an echo of the Allports' (1921, p. 38) pessimistic sentiments concerning the measurement of these traits expressed some years before, when they had to admit that, "owing to its (this trait's) importance many tests were sought by us and many possible correlations scrutinized, but with little result."

After this burst of investigations concerning these traits, and the discouraging and often conflicting results reported by them, the concepts of Extraversion-Introversion lost their popularity and little work was done in this area for some time.

(ii) Later Developments. A recent development in the investigation of Extraversion-Introversion is the Maudsley Personality Inventory (MPI). This is a questionnaire developed by Eysenck (1959) for the measurement of Extraversion-Introversion and neuroticism. On this questionnaire Eysenck's subjects showed no significant correlation between Extraversion and neuroticism and he concludes therefore that these traits, as measured by the Maudsley Personality Inventory, are independent and unrelated.

Commenting favorably on Eysenck's data and the conclusions drawn from that study, Jensen (1958, p.322) suggests that any slight correlation that may be found between Extraversion-Introversion and neuroticism could be explained in terms of the differences "in the social desirability of the introverted

and extraverted items." However, he is forced to admit that some of these 'slight correlations' between Extraversion-Introversion and neuroticism are not altogether so slight according to the data presented by him. As a matter of fact, these traits are correlated at the .05 level of significance for 200 normal adult males, and at the .01 level of significance for 145 university students of both sexes, and at the same level for another group of 86 nursing and mixed university students.

Such correlations are hardly in accord with Eysenck's conclusions. Jensen cannot explain this conflict, yet he concludes that, although Eysenck's theory may have deficiencies and his questionnaire may need improvements, even in its present form, "the Maudsley Personality Inventory . . . can be recommended for research purposes as being perhaps the best questionnaire measure of introversion-extraversion and neuroticism available at the present time." (1958, p.324)

Other investigators have found it difficult to accept such conclusions in the face of the conflicting results reported on the questionnaire. Bronzaft, Hayes, Welch, and Koltuv(1960) recently found Extraversion and neuroticism, as measured by the Maudsley Personality Inventory, to be negatively correlated. They conclude therefore that, contrary to Eysenck's theory and Jensen's interpretation of Eysenck's data, there is a negative relationship between Extraversion and neuroticism as measured by that questionnaire.

Cervin (1960) in his comparison of the results obtained from a battery of scales, - including his Emotional Responsiveness and Rigidity scales (1957), the Taylor Manifest Anxiety scale, and the Maudsley Personality Inventory (MPI) Extraversion and Neuroticism scales (Eysenck, 1959) - also found a significant negative relationship between Extraversion and neuroticism as measured by the respective MPI scales.

Further, Eysenck (1955) hypothesized that Taylor's Manifest Anxiety scale should show a strong positive correlation with the MPI Neuroticism scale and a smaller negative correlation with the Extraversion scale. This hypothesis is supported by Bendig's (1957) study, in which he found correlation coefficients, significant at the .01 level, between the three scales in the direction hypothesized. Similar findings were also reported by Jensen (1958). However, the correlation obtained by Cervin (1960) from several sizable samples, suggest that the Taylor Anxiety scale ratings are negatively correlated with both MPI scales.

Cervin (1960) further found that his Emotional Responsiveness scale displayed a significant positive correlation with the MPI Neuroticism scale and a significant negative correlation with the MPI Extraversion scale. A similar but less significant relationship was indicated between his Rigidity scale and the MPI scales. Nevertheless, he considers these correlations between the Extraversion-Introversion scores and the other personality measures used to be 'relatively' small. Since, moreover, the reliability of the MPI Extraversion scale is good, he feels the use of the Extraversion scale for prediction of behavior in experimental situations to be warranted. However, he also found that there are three subdimensions of Extraversion-Introversion -- quickness of reaction, level of activity, and degree of self control -- which are purer dimensions than Extraversion-Introversion, as measured by the MPI, and have more predictive power.

Jensen (1958) also reports correlation coefficients for the MPI scales with related measures, including Cattell's Contact Personality Factor scale (1954), the Minnesota TSEM Introversion-Extraversion scales (Evans, C., & McConnell, T.R., 1941), and Heron's Emotional Maladjustment and

Sociability scales (1956). These measures are reported to correlate with their respective MPI scales as expected by Jensen, except for Heron's Neuroticism scale, which shows a significant negative correlation with the MPI Extraversion scale.

Thus, Eysenck's theory and questionnaire have brought about renewed interest in these personality dimensions, their conceptual crystallization and measurement, and their relationship to other variables. Nevertheless, it seems that some of the confusion observed by Conklin (1923) in this area earlier still persists, especially in the relationship between present Extraversion-Introversion measures and neuroticism. This confusion can be interpreted as stemming either from the fact that Extraversion and Introversion may not be basic, independent personality traits; or, more plausibly, from the fact that the approaches of previous investigators to the measurement of these traits were inadequate from the points of view of reliability and validity and consequently were unable adequately to isolate Extraversion-Introversion from related traits. Conklin (1923) concluded the second alternative to be true for the early studies reviewed. From the above discussion it appears that this conclusion also applies to the later developments cited.

#### Critique: The Problems of Validity and Reliability

(i) Early Developments. In his review of early tests purporting to measure Extraversion-Introversion, Guilford notes their "wide divergencies in reliabilities and validities". (1934, p.337). Similarly Guthrie, speaking of Laird's questionnaire, credits it with 'substantial reliability' but has to conclude that the fact "that it is a test for introversion, however, is a pure assumption". (1927, p.84).

Guthrie's conclusion is essentially applicable to the validity estimates

of early Extraversion-Introversion questionnaires generally, for attempts at their validation consisted largely of arriving at correlation coefficients with other questionnaires of equally dubious validity purporting to measure the same traits. The validity coefficients obtained in this manner were, furthermore, consistently low. According to Guilford (1934), validity coefficients for Laird's questionnaire, for example, are .42 when compared with the Heidbreder questionnaire; .27 and .23 when compared with Conklin's (1927) test; and .40 to .53 when compared with self-estimates. The Heidbreder questionnaire in turn is reported (Freyd, 1924) to correlate .37 with self-associate ratings and .39 with Conklin's test.

Bernreuter's test (1933b) was so constructed as to give scores, when weighted differently, upon four different personality traits, of which Extraversion-Introversion is one. Validity coefficients of .92 and .99 are reported for this test; however, Extraversion-Introversion scores and scores for 'neurotic tendency', as measured by the same test, usually correlate .94. This fact, as mentioned earlier, led Bernreuter to conclude the two variables to be identical for his test.

According to Guilford, this "unsatisfactory state of the attempts at measurement in the field of Extraversion-Introversion" is partly the result of the "almost universal suspicion (in this early stage) that the introvert is inclined to maladjustment, if not to more serious instability." (1934, p.343). He states that consequently Bernreuter and others engaged in the construction of questionnaires of Extraversion-Introversion and 'neurotic tendency', found it difficult to keep the two from correlating significantly with one another. Guilford reports that this also applies to Laird's and Heidbreder's questionnaires, which were found to correlate .53 and .56 respectively, with Thurstone's Inventory of

neurotic tendency (Guilford, 1934).

Eysenck also has presented a review of such early investigations of Jung's hypothesis through the use of Extraversion-Introversion and neuroticism questionnaires (1953). And he also points out that neither the various Extraversion-Introversion nor neuroticism questionnaires correlated closely with each other; to the contrary, Extraversion-Introversion questionnaires correlated with neuroticism questionnaires almost as highly as individual questionnaires of either category with each other (1959).

(ii) Later Developments. Recently, the APA Committee on Test Standards, in its 'Technical Recommendations for Psychological Tests and Diagnostic Techniques' (Tolor, 1960), distinguished four types of validity: predictive, concurrent, content, and construct validity.

Predictive validity denotes correlation between the test and subsequent criterion measures, as the correlation of vocational interest or aptitude tests with later success would denote.

Concurrent validity denotes correlation between the test and concurrent external criteria, such as psychiatric diagnosis, for example.

Content validity is claimed if the test items can be shown to be an adequate sample of the universe under investigation.

In construct validation the meaning assigned to test scores is substantiated by demonstrating that the scores are consistent with deductions from the theory from which the meaning is derived. This validation process is much the same as that involving the validation of the theory itself.

We can distinguish among the four types of validity by noting that each involves a different emphasis on the criterion. In predictive or concurrent validity, the criterion behavior is of concern to the tester, and he may have no concern whatsoever with the type of behavior exhibited in the test. (An employer does not care if a worker can manipulate blocks, but

the score on the block test may predict something he cares about).

Content validity is studied when the tester is concerned with the type of behavior involved in the test performance. Indeed, if the test is a work sample, the behavior represented in the test may be an end in itself.

Construct validity is ordinarily studied when the tester has no definite criterion measure of the quality with which he is concerned, and must use indirect measures. Here the trait or quality underlying the test is of central importance, rather than either the test behavior or the scores on the criterion (APA, 1954), p.14).

Construct validity then is used for tests intended to measure a construct arising from some theory; the validation consists of evidence that the scores vary from person to person or occasion to occasion as the theory would imply.

It is such construct validity which Eysenck (1959) claims for his questionnaire. For, although Eysenck assumes Extraversion-Introversion and neuroticism to be completely independent, an integral contention of, or construct arising from, his underlying personality theory (1947, 1953) is that hysterics and psychopaths are extraverted and neurotic, while dysthymics, (Eysenck's overall-term for reactive-depressives, obsessive-compulsives, and those suffering from neurotic anxiety states) are introverted and neurotic. Construct validation of the MPI scales, therefore, requires that dysthymics should have high scores on Introversion and neuroticism, while hysterics and psychopaths should have high scores on Extraversion and neuroticism.

Jensen (1958) and Hildebrand (1958) tend to concur with Eysenck's claim of construct validity for his questionnaire. Hildebrand found that in his study "hysterics and psychopaths are clustered at the extravert end of the distribution, with the mixed neurotics occupying a central position." (1958)

However, Sigal, Star, and Franks, (1958a) in their investigation of the validity of the Extraversion and Neuroticism scales of the MPI found that hysterics and psychopaths, considered as one nosological group, are not significantly more extraverted than dysthymics. Indeed, according to them, hysterics

tend to have a lower mean Extraversion score than the normal group. Consequently, they conclude:

that either hysterics and dysthymics cannot be used in the described manner (i.e. in the context of Eysenck's personality theory construct), or the Extraversion-Introversion and Neuroticism scales do not measure Introversion-Extraversion and Neuroticism, or that both statements are true. (Sigal, et al. 1958a, p. 148).

Eysenck (1958, p.251) counters that really "their findings agree with prediction but fail to do so significantly." He suggests that their sample (of 52 subjects) was "not sufficient to bring out the significance of their findings." He further points out that additional studies with bigger samples showed statistically significant differences between the groups in the expected direction.

In a rejoinder Sigal, Star, and Franks (1958b, p.381) claim that Eysenck "committed errors of logic and arrived at incorrect conclusions".

They point out that their:

results suggest that the use of these groups would limit the range to the introverted side of the Extraversion-Introversion continuum, that it would provide no information about the validity of tests or theories in the extraverted end of the continuum, and that tests constructed using hysterics and dysthymics as criterion groups might produce markedly skewed distributions when used in the normal population. These groups, used as a pair are, therefore, inadequate as criterion groups in the measure of Extraversion-Introversion, if the Extraversion scale is a valid measure of Extraversion-Introversion. (p.381).

They reaffirm their original conclusion, namely,

either hysterics and dysthymics cannot be used as criterion groups in the measure of Extraversion-Introversion, or the Extraversion-Introversion and Neuroticism scales do not measure Extraversion-Introversion and Neuroticism, or that both statements are true. (p.382).

Thus it seems that not all the confusion observed earlier in this area has been resolved. Whether or not Eysenck's questionnaire will eventually be accepted as a valid measure of Extraversion-Introversion will depend largely on the results of further studies concerning the validity of its underlying



theoretical construct.

Many paper and pencil tests are reported to have high reliability, and consequently they also are assumed to have a high potential validity (Cronbach, 1960) for the measurement of Extraversion-Introversion. To translate this high potential validity into actual validity for the measurement of these traits would require item selection sufficiently pure to isolate them from related traits. Such pure item selection in turn would require a clear conceptualization of the nature of these traits (Conklin, 1928). As seen from the discussion above, these requirements have, as yet, not been met by the paper and pencil tests reviewed; consequently approaches using these tests for the measurement of Extraversion-Introversion have proved to be inadequate.

#### The Projective Approach

Measurement of Extraversion-Introversion has also been approached from the more unstructured point of view of projective techniques, which are finding wide and increasing use in present-day studies of personality. These techniques are potentially the most penetrating diagnostic instruments available for personality and psychotherapeutic research.

One category of projective techniques, dealing with the analysis of the 'artistic' productions of the subject, appears particularly suitable for investigations concerned with overt expressive traits of the type under consideration in this study.

Free drawings, for example, reveal a great deal about the person who has drawn them. So much so, that recently several such drawing analysis techniques have developed into diagnostic clinical instruments. Their interest has been focussed largely upon the content - the object or literary ideas - of these drawings.

It has been found, however, that drawings also lend themselves to analysis of their form quality, that is, how it was drawn rather than what was drawn. The expressive movements employed in drawing leave tell-tale clues which enable the investigator to tell, for instance, whether the artist worked tensely and rigidly, or freely and uninhibitedly. It is possible, then, to trace a correlation of the emotional attitude of the subject with his form production and find an approach to personality through formal criteria of style. (Waehner, 1942). Such formal analysis should lend itself particularly well to the investigation and measurement of Extraversion-Introversion, since, as stated earlier, these traits manifest themselves overtly in the style, or form, of the subject's expression.

Not surprisingly, therefore, it is found that one widely used set of criteria for assessing the form quality of spontaneous drawings, that of Paula Elkisch (1945), defines Extraversion-Introversion, or rather expansion-compression as she calls them, as one of four basic criteria for the analysis of the form quality of drawings.

Elkisch's criteria were formulated after a study of a group of problem children's drawings and they center about the concepts of 'adjustment' and 'maladjustment'. As pointed out earlier (Collier & Emch, 1938), identification of Introversion with neurotic tendency, and Extraversion, per contra, with normality is not in line with Jung's original arguments, for according to Jung (1923), "It is a mistake to believe that introversion is more or less the same as neurosis. As concepts the two have not the slightest connection with one another." Therefore, in applying Elkisch's technique to this study, care was exercised not to adopt the concept of adjustment into a situation where it is not applicable; only the strictly formal aspects of her criteria were retained.

On page 13 of her monograph, Elksch (1945) defines this criterion of expansion-compression, or Extraversion-Introversion as it will be called for the sake of consistency throughout the discussion, as follows:

Expansion is expressed; a) Through a widening of the space at the drawer's disposal by presenting only part of the object - this might also be abstraction- which has to be completed by imagination; b) through the creation of a spacious background which may be presented on a sheet of paper of any size; c) through the creation of an experience of space by means of rhythm and integration. For example, a well formed representation of an explosion expands the space by 'bursting it'. Such an expression conveys a controlled aggressiveness, willful and forceful activity.

Expansion stimulates the imagination dynamically. It conveys an atmosphere of freedom, courage, adventure, and may be a symptom of vitality and healthily developed extraversion. Expansion stands for a direction toward the surrounding world; for a potential ability of making contact.

Thus expansion is that quality in a drawing which implies that the drawer has expressed himself freely and uninhibitedly, with imagination and a sense of proper relationship between the objects drawn and the background. Or briefly, an expansive drawing is one that shows imagination and is made with free, bold lines and good use of the drawing space available.

Compression is based on a meticulous, fearful concept of space, expressed either in the spatial appearance of the object itself, or the space at the drawer's disposal. Compression conveys a feeling of discomfort, of being shut in, of pressure and compulsion. Compression may, if connected with other traits, be a symptom of a neurotically developed introversion, even of a compulsion-neurosis. Compression stands for isolation. (p.15)

Compression, then, is a quality in a drawing which indicates that the subject has been unable or unwilling to express himself freely. More specifically, compression is indicated by flat geometric representations and by a lack of any effort to portray life and willful activity. Some other signs of compression are timid, faint lines; rigid, minute pictures, or conventional and abstract pictures. Another common sign of compression is poor proportion - the picture is usually too small for the drawing space available; paucity of ideas is also

indicative of compression.

These definitions by Elkisch clearly deal with the same expressive traits previously defined by Jung as Extraversion-Introversion. However, they do not cover the full extension or bi-polar range given them by Jung, since expansion as defined by Elkisch seems to fall somewhere between the polar extreme of Jungian Extraversion and mid-polar ambiversion. Although extreme polarity represents an abnormal manifestation of these traits, even in Jungian terms, it must be accounted for in order to achieve an adequate conceptualization of their entire bi-polar dimension.

Elkisch's description of the style manifestations of these expressive traits in terms of control, going from severe overcontrol in polar compression to healthily balanced control in normal expansion, will therefore have to be extended to cover lack of control over expression in polar expansion, the style manifestation of which might be called lability.

Lability, then, is simply that quality in a drawing which implies that the drawer was unable to exercise control over, and impose organization upon, his production within the drawing space at his disposal.

Other investigations into the products of 'artistic' expression largely support Elkisch's definitions of the overt manifestations of these behavior traits in the productions of her subjects. In their surveys of artistic behavior in the abnormal, Anastasi and Foley (1940, 1941) mention many of the characteristics of 'maladjusted subjects' drawings which would come under the heading of compression according to the Elkisch system. To mention only a few:

Pflister found 'small, faint line' drawings among fearful neurotics as well as chronic schizophrenics and the final stages of catatonia. (1941, p.193).

Reitman reported that "the chief characteristics of the reproduced

drawings by schizophrenics were their stiffness and lack of expressiveness." (1941, p. 196).

One of Traube's conclusions after the study of children's drawings was that "extremely small drawings were often associated with feelings of inferiority." (1941, p. 218).

These instances may serve to show that there is other evidence supporting the placing of small drawings, for example, under the heading of compression.

Other aspects of Elkisch's definitions of these traits, or rather the overt manifestations of these traits, are similarly supported by independent research and are brought out particularly clearly by Traube's (1941) further conclusion that geometric, and especially flat, representations of objects, absence of living beings in a picture, and lack of any effort to portray movement suggest mental retardation. Lembke (1930) reported similar findings in his study of drawings of bold and timid children.

We see then that projective measurement of Extraversion-Introversion, and of other expressive traits, is entirely possible. Elkisch claims to have isolated these traits by projective criteria and, hence, they appear to be independent. The problem concerning the measurement of Extraversion-Introversion, as brought out in the above discussion, consists of finding an adequate, i.e. valid and reliable, approach for the isolation and measurement of these traits.

#### Critique: The Problem of Validity and Reliability

As stated earlier, projective measurement is potentially the most direct and penetrating of personality measurement techniques. Nevertheless, however direct and penetrating in its measurement, it is still essentially subjective in the nature of its required interpretation; the experimenter makes a

clinical judgement as to the rating to be assigned the subject on the particular task in question.

However, aside from its validity, the usefulness of a measurement technique, projective or other, is determined by the answers to two basic questions:

a) How stable is a given subject's (Extraversion-Introversion) score from one experimental session to another?

b) How reliable is this measurement from one experimenter to another?

The answer to the first question is a vital one to an understanding of what this measure means in terms of the subject's general personality constellation.

A study of expansion - compression ratings of subjects who have participated in more than one experimental session shows that subjects do change in their degree of expansion-compression (i.e. Extraversion-Introversion). Frequently, a subject is compressive on his first drawing or two; however, as he warms up to the situation and becomes adjusted to his task, he frequently begins to expand. (Humphrey, 1946).

In answer to the second question, it seems obvious that there are subjective elements involved in these judgements and that therefore some degree of variability from experimenter to experimenter is to be expected. Humphrey and Stuart (1946), both clinically experienced, made their judgements independently and found that they correlated .67 and .77 (for 32 and 63 cases respectively). Although explaining only 40-50 percent of experimental variance, this would show a relatively good degree of agreement for material of this nature. However, Humphrey also tested four other judges, of whom only

one had any clinical experience, and found that his judgements alone showed a significantly high correlation with hers for practical purposes.

A number of other studies have also shown clinical judgement to be highly variable from clinician to clinician. In their study of interjudge agreement among 60 clinical psychologists, Hunt, Arnoff, and Cotton (1954), for example, found a range from .02 to .93 on a fairly well defined task with clearly stated criteria. Furthermore, when extreme groups with respect to clinical sophistication have been compared, the results have not uniformly favored the most highly trained. (Arnoff, 1954).

Understandably then, there is a reluctance among clinicians to accept other clinicians' judgements. And there is, of course, an even greater reluctance among individuals from outside the field to do so. Consequently, if such clinical insight of the experimenter is a prerequisite for the use of Elksich's rating technique, then its application would be limited even in the clinical setting. However, the concepts of Extraversion-Introversion are of a far more general nature and should find useful application in a wider context, in a broader field of investigation.

The problem, therefore, is how to make such projective material objectively shareable without losing its most useful aspects, which lie in the directness of its measure. This problem of successfully translating projective material and individual clinical insights into objectively shareable form is one of the most formidable challenges - according to Rapaport (1942) the sine qua non - of diagnostic testing and clinical psychology today.

Clearly, objectification here necessitates the use of instruments and techniques of investigation which prevent the experimenter from entering the experimental situation in any way that would influence or cloud the measure

obtained from the subject, while preserving the direct, projective nature of the technique.

Conclusion. If one accepts the claims of Elkisch, that the traits Extraversion and Introversion have been isolated, then, one may assume that they are independent. The inability of paper and pencil tests to measure these traits effectively must be ascribed to certain inadequacies in these approaches, rather than to a lack of independence on the part of these traits themselves.

To be adequate an approach must be both valid and reliable. Indeed, Cronbach (1960, p. 132) considers these two criteria to be closely related. He asserts that "the correlation between the test and an independent criterion can never be higher than the square root of the correlation between two forms of the test." (1960, p. 132). According to Cronbach's rationale then the maximum possible validity of any measure is the square root of its reliability.

With their relatively high reliabilities, paper and pencil tests would have a correspondingly high potential validity. However, in order to realize this potential and to translate it into actual validity, relatively pure item selection is required. According to Conklin (1923) such pure item selection was not achieved by early investigators, because they failed adequately to conceptualize Extraversion-Introversion as independent traits. Consequently, the actual validity achieved for their tests is generally low.

The actual validity of Eysenck's recent MPI Extraversion-Introversion scale has not been clearly established as yet, since he formulated it in the framework of a theoretical construct which at present is itself lacking adequate validation. The actual validity of the MPI Extraversion-Introversion scale will consequently be a function of the validity of the underlying theoretical construct.

Since paper and pencil tests to date generally have low actual validity



for the measurement of Extraversion-Introversion, approaches to these traits through the use of these tests have so far proved inadequate. Projective criteria, on the other hand, have been shown to lack adequate reliability, especially when employed by investigators lacking in clinical experience (Humphrey, 1946). Consequently the actual validity of projective techniques for the measurement of these traits is impaired and often inadequate.

It can be concluded then that neither paper and pencil tests nor projective criteria provide a measurement of Extraversion-Introversion that is sufficiently adequate from the points of view of both reliability and validity.

#### The Semantic Differential Approach

As we have seen, neither the objectively quantified, indirect approach, nor the more direct but subjective approach of projective techniques provide for measurement of Extraversion-Introversion that is both sufficiently valid and reliable. The former approach is reliable, yet of questionable actual validity, while the latter is apparently valid but lacks reliability. And, of course, according to Cronbach, low reliability also indicates a correspondingly low actual validity.

What seems needed, then, is a measurement that provides a synthesis of objectively quantified scale reliability with the validity inherent in the measurement of these expressive traits through projective techniques. The method of the Semantic Differential seems to provide such a synthesis.

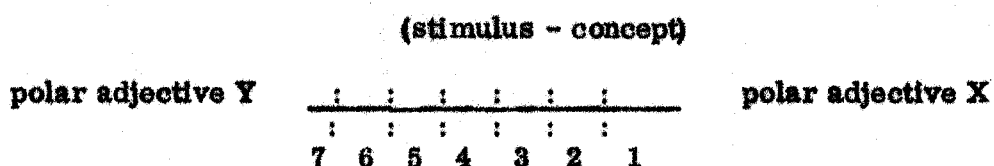
According to Osgood (1957) this method is:

essentially a combination of controlled association and scaling procedure. We provide the subject with a concept to be differentiated and a set of bi-polar adjectival scales against which to do it, his only task being to indicate for each item (pairing of a concept with a scale) the direction of his association and its intensity on a seven-step scale. (p. 20)

Further, the Semantic Differential is not a 'test' with a definite set of items and a specific score, but rather:

it is a very general way of getting a certain type of information, a highly generalizable technique of measurement, which must be adapted to the requirement of each research problem to which it is applied. (1957, p.120)

There are no standard concepts and no standard scales, but rather the choice of either depends on the particular requirements of each individual experimental situation. Its general form, however, can be described as follows:



X and Y represent the polar directions open to the subject's choice, while the seven point space dividing them yields an indication of the subject's intensity of association between the stimulus - concept and the polar direction chosen. Thus, the direction taken from the mid-polar origin (i.e. 4) depends on the alternative polar adjective selected and can be thought of as the quality of association.

The distance checked from the mid-polar origin, or the extremeness of the scale position checked toward the polar extreme, is the intensity of the association. The seven degrees of intensity are defined for the subject as:

- |   |                 |
|---|-----------------|
| (1) extremely X                         | (7) extremely Y |
| (2) quite X                             | (6) quite Y     |
| (3) slightly X                          | (5) slightly Y  |
| (4) neither X nor Y, or equally X and Y |                 |

According to Osgood et al. (1957), these scale distance definitions of slightly, quite, and extremely can be taken to yield nearly perfectly equal increasing degrees of intensity, with equal differences from scale position to scale

position for either direction. To support this contention of equal-intervals for the scale positions of the Semantic Differential they cite a study by Norman Cliff at Princeton which found the same adverbial quantifiers to yield almost perfectly equal increasing degrees of intensity. In this investigation it will be assumed, therefore, that the intervals between the Semantic Differential scale positions are equal.

### The Applicability of the Semantic Differential

Although a general technique, the Semantic Differential was originally designed to tap variations in representational mediation processes in the context of Osgood's theory of meaning as a representational mediation process. Much of the research involving the Semantic Differential to date has centered around the meaning of certain concepts, or has dealt with comparisons of the connotative meanings of various concepts. It has also been applied in this manner to the evaluation of the connotative meaning of various projective materials, notably the cards of the Rorschach (Rabin, 1959; Sines, 1960), the TAT (Osgood et al. 1957), and the Bender Gestalt (Tolor, 1960).

Indeed, Osgood (1957) considers the Semantic Differential to be a technique applicable to at least the quantification of projective and introspective data, if not their objectification. He argues that it should be possible to index a subject's reactions by having him make judgements against the differential scales. (p.237). He goes on to point out that:

aspects of the semantic measurement operation other than the meanings of concepts per se may be relevant to personality variables . . . and even the way the subject checks the scales (e.g. the dispersion of his check marks toward the extremes) may relate to a trait like 'constriction'. (p.219)

Marked differences between individuals in their personal checking 'styles' on the Semantic Differential scales were reported by Osgood and

Stagner (1957) as early as 1946 and Osgood cites various studies attempting to relate these differential styles to intellectual, situational, emotional, and other variables.

He concludes that there have not been "as yet tested any specific hypotheses relating scale-checking styles to personality variables," (1957, p.227), except perhaps one fragmentary investigation carried out at the University of Nebraska. In that study 'constriction' as judged by peers was correlated with the dispersion of judgements over the semantic scales, and it was found that subjects judged more constricted tended to avoid the polar extremes, 'compressing' their judgements toward mid-polar neutrality. (p.227)

The above study, though fragmentary, seems to have dealt essentially with the same trait described as Introversion by Jung (1923), reclusion by Allport (1939), and compression by Elksch (1945) in the context of our foregoing discussion of Extraversion-Introversion.

Apparently, the Semantic Differential has face validity as a technique for the investigation of Extraversion-Introversion. As such it should have definite advantages over earlier discussed techniques in that it seems to meet both essential criteria, reliability and directness of measure, established in our discussion above for effective measurement of these traits.

First, it is objective, quantified, and reliable. It eliminates the idiosyncracies of the investigator or clinician, his personality, biases, intuitive judgement. Indeed, with this method "two investigators given the same collection of check-marks and following the rules must end up with the same meanings of concepts and patterns of conceptual structures." (1957, p.125). Osgood also provides test-retest correlation data of 40 items, selected at random from 1000 used in his initial item factor analysis, correlated across 100 subjects and

yielding a reliability coefficient of .85 (1957, p.127).

Second, it seems to lend itself to a rather direct, nearly projective type of measurement, for it can be reasoned that if the stimulus situation to which the subject is required to respond is relatively ambiguous, it will enable the subject optimally to reveal his individuality of functioning, his private idiosyncratic meanings, attitudes, and organization in a fashion basically alike to free projection and yet adapted to, and measuring, a specially preselected set of personality dimensions in an objective, quantified manner.

This study attempts to bring about such concurrent validation of the Semantic Differential as a measure of the expressive traits of Extraversion-Introversion.

## CHAPTER I I I

### METHODOLOGY AND PROCEDURE

**Hypotheses.** 1. The Semantic Differential technique can be used to discriminate effectively between extraverted and introverted subjects and to predict these traits for the subjects tested from their scores obtained on the Semantic Differential.

2. Further, it is expected that it will be the intensity scores of the Semantic Differential, rather than its direction scores, that will serve as the basis for discrimination between Extraversion and Introversion.

**Subjects.** The subjects for this study were 44 undergraduate university students, 20 males and 24 females, attending Assumption University of Windsor and ranging in age from 18 to 31 years, the average being 19 years old.

All were volunteers and unaware of the theoretical considerations underlying this investigation. For the sake of convenience in presenting the material, they were divided into three groups, two consisting of 14 subjects each and one of 16 subjects, but the experimental procedure was the same for each group. Each group was assigned to a different experimental session.

One compressive subject's Semantic Differential judgements were unscorable and her record had to be discarded.

**Materials.** Ten Semantic Differential scales of bi-polar adjectives (Appendix, Table 6) were selected from a list of such scales factor analysed by Osgood et al. (1957, ch. 2). In his factor analysis of these scales, Osgood found three general and pervasive factors to dominate semantic space, namely:

evaluation, (measured by scales such as good-bad), potency (measured by scales such as strong-weak), and activity (measured by scales such as fast-slow). The significance of these factors lies in their relationship to semantic space as perceived by Osgood - an area not of direct concern to this investigation - rather than in their relationship to the expressive traits under investigation here. These considerations could therefore have been disregarded.

However, for the sake of continuity between Osgood's Semantic Differential technique and the adoption of the technique for this investigation, it was considered better to retain as much of the original technique as was compatible with the nature of this investigation. There are several reasons for this, the most important perhaps being the preservation of test standards, such as reliability, established for the original. Another reason, of course, is the possibility of a more effective statistical analysis as a result of the factor analysis data provided by Osgood for the scales. A third reason is the greater comparability of results from this investigation with results from other investigations employing the Semantic Differential.

The ten scales used in this study were therefore selected on the strength of their face-validity for the measurement of Extraversion-Introversion, as well as their factorial loading in the factors of evaluation, potency, and activity. The first three Semantic Differential scales show a high loading in the evaluation factor, the second three in the potency factor, and the third three in the activity factor. In addition, one aggressiveness scale was included for its apparent relevance to the dimension of Extraversion-Introversion and for its correlation with the activity factor. The positive poles (e.g. good, strong, fast, etc.) of all ten scales were arranged on the left, the negative poles (e.g. bad, weak, slow) on the right.

Seven Rorschach cards (I, II, III, IV, V, VII, and VIII) were chosen as stimuli to be rated on these scales, and then to be drawn. It was reasoned that if the stimulus situation to which the subject is required to respond is relatively ambiguous, it will enable him optimally to reveal the individuality of his functioning, his private idiosyncratic attitude and organization, and consequently the traits under investigation.

Experimental Procedure. The subjects were informed as to the rating technique for the Semantic Differential according to the standard instructions suggested by Osgood et al. (1957, p. 83). Then the first Rorschach card was projected onto a screen (using a slide projector) for approximately three minutes, during which time the subjects made their ratings. The three-minute time limit had been found adequate by previous investigators using the Semantic Differential technique (Rabin, 1959). After all the subjects completed rating the first card, it was removed and the subjects were supplied with blank sheets of 9" by 12" paper and told that "different people see different things in these cards, draw whatever you saw in this one."

After all drawings were completed for card one, the second card was exposed and the same sequence repeated for it and the five subsequent cards.

Treatment of the Data. The method of analyzing form qualities in drawings was described by Elkisch (1945) in her monograph. According to her, if compression is recognizably present a score of 0 is given, if expansion is shown a score of 1.0 is recorded. When neither expansion nor compression is easily recognizable the score given is .5.

Since in this study the possible style manifestations of Extraversion-Introversion were supplemented to include lability, a score of 2.0 was to be given if lability was clearly indicated in the drawing, and a score of 1.5 if the



drawing style fell between expansion and lability, with neither clearly recognizable.

Of the seven responses to the seven stimulus cards the first two were considered practice responses and were consequently discarded. Since five drawings were rated for each subject, the total form-quality score for each subject's set of drawings ranged from zero to ten.

In the present study the cut-off points for the separation of the subjects into groups, according to the recognizable presence of lability, expansion, or compression in each set of drawings, was arrived at by summing the scores for each picture within the set and reducing this sum to an average score. If the subject's average score was less than .5, he or she was classified as compressive.

To be rated expansive, on the other hand, a subject had to have an average score of .5 or greater, the upper limit being 1.4; while an average score of 1.5 was to represent the lower limit for a rating of lability.

Thus, if the sum of the scores for a subject's set of five drawings ranged from 0 to 2.0 the subject was rated as compressive; if it ranged from 2.5 to 7.0 he was rated as expansive; and if it was 7.5 or more he was rated as labile.

For the analysis of the intensity of judgements, the seven positions on the Semantic Differential scales were assigned the digits 3, 2, 1, 0, 1, 2, 3 in that order, fixing an origin of 0 in the center of the semantic space between the bi-polar adjectives, as suggested by Osgood (1957). Corresponding to the scale position checked, a scale score increases toward either extreme or pole.

Since each subject rated five stimulus concepts and therefore had a set of five scores for each scale, these scores were summed to arrive at an overall scale score. Since these scales in turn had been organized into three

factorial categories - evaluation, potency, and activity - of closely related scales, the scores of the scales within each category were summed as well to obtain factor scores.

A similar procedure was followed to arrive at the factor scores for the direction of the subjects' judgements on the scales. However, for the analysis of the direction of the judgements, the seven scale positions of the Semantic Differential were numbered 7, 6, 5, 4, 3, 2, 1, increasing from the negative to the positive pole.

Then the intensity and direction scores for the three factors (each measured by three scales, scores from the aggressiveness scale were disregarded to simplify the statistical analysis) were correlated with Extraversion-Introversion scores and the regression of actual Extraversion-Introversion on the intensity scores of the three Semantic Differential factors was obtained.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF RESULTS

Formal analysis of the drawings of the 43 subjects yielded 26 overall-compressive and 17 overall-expansive ratings. None of the subjects was rated labile.

Table 1 gives the Biserial intercorrelations for the intensity of Semantic Differential judgements between expansion - compression (i.e. Extraversion-Introversion) and the other three variables of this investigation, namely the three predictive indices of the Semantic Differential - the factors of evaluation, potency, and activity.

TABLE 1

INTERCORRELATIONS AMONG THREE SEMANTIC DIFFERENTIAL INTENSITY VARIABLES AND ONE INDEX OF EXTRAVERSION-INTROVERSION

Variable	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>
X <sub>1</sub>	----	.368	.400	.431
X <sub>2</sub>	.368*	----	.414	.558
X <sub>3</sub>	.400**	.414	----	.464
X <sub>4</sub>	.431**	.558	.464	----
Mx	1.732	21.348	24.210	27.420
x	1.505	6.975	6.705	6.456

\*p .05 = .304

\*\*p .01 = .393

- Where  $X_1$  = the Extraversion-Introversion ratings on the basis of projective criteria;
- $X_2$  = Semantic Differential scores for the evaluation factor;
- $X_3$  = Semantic Differential scores for the potency factor; and
- $X_4$  = Semantic Differential scores for the activity factor.

Table 1 shows that the correlation coefficients between Extraversion-Introversion and the three factors of the Semantic Differential are all significant. The correlation coefficients between Extraversion-Introversion and the potency and activity factors are significant beyond the .01 level, while that between Extraversion-Introversion and the evaluation factor is significant beyond the .05 level. Table 1 further shows that the correlation coefficients among all three Semantic Differential factors are significant as well.

For the direction of the Semantic Differential judgements, the biserial intercorrelations among Extraversion-Introversion and the three factors of the Semantic Differential are shown in table 2. They indicate that Extraversion-Introversion ratings do not correlate significantly with the directions of the three Semantic Differential factors.

TABLE 2

INTERCORRELATIONS AMONG THREE SEMANTIC DIFFERENTIAL DIRECTION VARIABLES AND ONE INDEX OF EXTRAVERSION-INTROVERSION.

Variable	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>
X <sub>1</sub>	----	.266	.058	.106
X <sub>2</sub>	.266	----	.509	.372
X <sub>3</sub>	.058	.509	----	.106
X <sub>4</sub>	.106	.372	.106	----
Mx	1.732	62.930	67.810	66.770
x	1.505	9.645	8.960	10.620
<p>*p .05 = .304  **p .01 = .393</p>				

The data in table 2 support the hypothesis that the direction of Semantic Differential judgements does not correlate significantly with Extraversion-Introversion. It follows then that Semantic Differential direction scores will not predict these traits within individuals.

Semantic Differential intensity scores on the other hand, correlate with Extraversion-Introversion. This suggests that they may predict the traits of Extraversion and Introversion as was hypothesized. To estimate the predictive power of the Semantic Differential intensity scores, multiple regression of Extraversion-Introversion on the Semantic Differential intensity scores was obtained. Table 3 shows the data for the solution of the regression coefficients for the multiple regression equation. (Doolittle's method)

TABLE 3

REGRESSION COEFFICIENTS OF THE MULTIPLE REGRESSION OF EXTRA-  
VERSION - INTROVERSION ON SEMANTIC DIFFERENTIAL INTENSITY SCALES

1 Variable	2 b <sub>1k</sub>	3 r <sub>1k</sub>	4 b <sub>1k</sub> r <sub>1k</sub>	5	6 b <sub>1k</sub>	7 M <sub>k</sub>	8 (-MK) b <sub>1k</sub>
X <sub>2</sub>	.1336	.368	.049165	.215	.028	21.348	- .598
X <sub>3</sub>	.2284	.400	.091360	.224	.051	24.210	- 1.234
X <sub>4</sub>	.2505	.421	.107966	.233	.058	27.420	- 1.590
			.248491 = R <sup>2</sup>				- 3.422
			.495 = R			M =	1.723
						a =	1.690

The regression equation derived from table 3 reads:

$$X'_1 = -1.690 + .028 X_2 + .051 X_3 + .058 X_4$$

where X'<sub>1</sub> stands for the predicted Extraversion-Introversion score, in contrast to X<sub>1</sub> which stands for the actual score received by the subject.

This equation means that for every unit of change in X<sub>2</sub> (the evaluation factor score), X<sub>1</sub> is changing by .028 units; for every unit of change in X<sub>3</sub> (the potency factor score), X<sub>1</sub> changes .051 units; and for every unit change in X<sub>4</sub> (the activity factor score), X<sub>1</sub> changes .058 units.

To obtain an index of the predictive power of the three factor scores of the intensity of Semantic Differential judgements for the prediction of Extraversion-Introversion, the Semantic Differential intensity scores (for all three factors) of each of the 43 subjects were applied to this regression equation. The predictive scores derived in this manner were then compared with the actual scores given these subjects on the basis of projective analysis of their drawings. Put into the context of a contingency table, this comparison of predicted ratings with actual ratings can be seen in table 4.

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The score distribution in table 4 yields a phi coefficient of .433 and a chi square of 8.815, which is significant beyond the .01 level, for one degree of freedom.

TABLE 4

A COMPARISON OF ACTUAL RATINGS AND PREDICTED RATINGS OF EXTRAVERSION - INTROVERSION (E - I).

		<u>actual ratings</u>		
		E	I	
<u>predicted ratings</u>	E	10	4	14
	I	7	22	29
		17	26	43

The relatively close relationship found between actual ratings of Extraversion-Introversion and predicted ratings of individuals on these traits, as shown by table 4, and its high level of significance, support the original hypothesis of this investigation, namely, that the Semantic Differential technique can be used to discriminate effectively between extraverted and introverted subjects, as determined by the Ekisch method, and to predict these traits for the subjects tested from their scores on the Semantic Differential.

The hypothesis that the intensity scores of the Semantic Differential, rather than its direction scores, will provide the basis for discrimination between Extraversion-Introversion is also substantiated by the data obtained.

The amount of variance in actual Extraversion-Introversion scores explained by the Semantic Differential intensity scores is 24.85 per cent, as

shown by the coefficient of multiple determination ( $R^2$ ) seen in table 3. This coefficient of multiple determination represents the sum of three coefficients of partial determination for this investigation, namely the three Semantic Differential factors. Of the three, the evaluation factor explained .049 per cent of the total variance; the potency factor explained .091 per cent; and the activity factor explained .108 per cent. (Table 3, col. 4)

### Discussion of Results

In line with earlier definitions of Extraversion and Introversion as expressive traits revealed most directly by style, the Semantic Differential discriminated between, and predicted these traits on the basis of purely formal criteria of rating style, rather than on the basis of positive or negative scale content, i.e. on the basis of intensity of judgements, rather than their direction.

The amount (25%) of variance in actual Extraversion-Introversion scores explained (predicted) by the Semantic Differential intensity scores may not seem very impressive; however, if viewed in the context of previous results of the measurement of Extraversion-Introversion, it appears substantial.

Early paper and pencil tests, as discussed previously, generally show rather low correlation coefficients when compared with other, similar measures. And, even those low correlations are not clearly interpretable in terms of Extraversion-Introversion, for these tests were based upon an inadequate conceptualization of these traits and consequently were unable to isolate them from other variables such as for instance neuroticism. Their actual validities, therefore, are quite low.

Eysenck's recent effort, the MPI, depends for its validation upon the validation of the theoretical construct underlying it, the validity of which is, as yet, inconclusive. Its actual validity at present is, therefore, debatable.



Projective techniques, on the other hand, though at times, usually when employed by skilled clinicians, reported to be relatively reliable and consequently also relatively valid, are unable to maintain reliability from experimenter to experimenter. For this investigation, the degree of agreement among four independent judges rating the drawings of the subjects was determined by deriving a multiple correlation between their ratings. All four independent judges had some, and two considerable, clinical experience. The coefficient of multiple correlation between them was found to be .82, which is in line with the reliability coefficients obtained for these projective criteria earlier.

As stated earlier, clinical judgement usually varies widely from clinician to clinician and from experimental situation to experimental situation. Consequently, although the Semantic Differential may explain merely 25 per cent of the variance for these traits, this represents a better level of consistent determination than can be claimed for any other measure of these traits discussed; and it may be hoped that the Semantic Differential, as an instrument for the discrimination and prediction of these traits, will prove more effective than the other measures discussed.

Moreover, the obtained level of determination only represents its present validity, while its potential validity (square root of reliability) is much higher. Furthermore, validity of the Semantic Differential is likely to be higher than the coefficient of multiple determination arrived at in this investigation would indicate, because in using a projective technique as a criterion measure, its relatively unstable nature clearly detracted from the predictive power of the Semantic-Differential. Unfortunately, at present there is no more valid criterion with which to compare the Semantic Differential.

Another fact, which may have affected and lowered the discriminative

and predictive performance of the Semantic Differential, is the absence of labile subjects in the sample tested. Lability is a polar expansive character trait. The absence of one polar extreme, and the consequent limitation of the range, would very likely limit the discriminative and predictive power of a measuring instrument (Semantic Differential) correspondingly, for it is reasonable to assume that a better discrimination index may be obtained, if polar extremes are present in the sample tested. Therefore, if the Semantic Differential discriminates between, and predicts, these traits so significantly for diagnostic groups of less than full range, it can be reasonably expected that the actual discriminative and predictive power of the Semantic Differential is greater. This might be a hypothesis for further investigations.

The absence of 'labile' subjects in the sample used can be explained by the rather select nature of that sample. Polar lability would be too disabling a character impediment to be found in a sample of university students. A sample including subjects with character disorders indicative of under-control, such as psychopaths, should provide a more representative range on the Extraversion-Introversion continuum. (Cervin, 1957).

## CHAPTER V

### SUMMARY AND CONCLUSIONS

Available questionnaire measures of the Extraversion and Introversion traits were examined and found to be lacking in validity. Projective measurement, was found to be unreliable and consequently lacking validity as well. The suitability of a new measure for the discrimination and prediction of these traits using Semantic Differential was investigated.

A sample of 43 subjects was divided into two diagnostic categories of expansives (extraverts) and compressives (introverts) on the basis of five drawings obtained from each subject and analysed according to Elkisch's formal criteria of style; 26 subjects were judged to be expansive and 17 compressive.

The Semantic Differential judgements of the Rorschach cards by Ss in each group were analysed for the two qualities of intensity and direction. Extraversion-Introversion ratings based on projective criteria were found to correlate significantly with intensities of all three Semantic Differential factors. They did not correlate significantly with the direction scores of Semantic Differential judgements. The coefficient of multiple determination for the Extraversion-Introversion ratings and the three Semantic Differential intensity scores was found to be .248, indicating that the amount of explained variance is 24.85 per cent.

A multiple regression equation was obtained, predicting Extraversion-Introversion ratings from Semantic Differential intensity scores. The predicted scores were found to be associated with the actual ratings beyond the .01 level of significance.

The results obtained support the hypothesis of this investigation; that the Semantic Differential technique can be used to discriminate effectively between extraverted and introverted subjects as well as to predict these traits from Ss' Semantic Differential scores. Predictions by means of the Semantic Differential are based on its intensity, rather than direction scores.

## APPENDIX A

TABLE 8

EXPANSION-COMPRESSION RATINGS OF FOUR JUDGES FOR 43 SUBJECTS  
ON THE BASIS OF PROJECTIVE CRITERIA

Judge	A	B	C	D	Subject
	0	0	0	0	1
	0	1	0	1	2
	0	0	0	0	3
	0	0	0	0	4
	1	1	1	1	5
	1	1	1	1	6
	0	0	0	1	7
	0	0	0	0	8
	0	0	0	0	9
	0	0	1	0	10
	1	1	1	1	11
	0	1	1	1	12
	0	1	1	1	13
	0	1	1	1	14
	0	0	1	0	15
	0	0	1	1	16
	1	1	1	1	17
	1	1	1	1	18
	1	1	0	1	19
	0	1	1	0	20
	1	1	1	0	21
	1	0	1	0	22
	1	1	1	0	23
	1	0	1	0	24
	0	0	0	0	25
	0	0	0	0	26
	1	0	0	0	27
	1	1	1	1	28
	0	1	1	1	29
	1	1	0	1	30
	0	0	0	0	31
	0	0	0	0	32
	0	0	0	0	33
	0	1	0	1	34
	1	1	1	1	35
	1	1	1	1	36
	1	1	1	1	37
	0	0	0	0	38
	1	0	0	0	40
	0	0	0	1	41
	0	0	0	0	42
	0	0	0	0	43
	17	20	21	20	

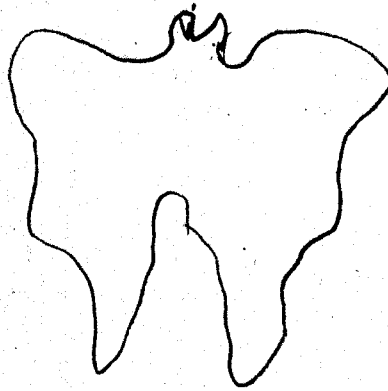
- Card I.

a lot.

DRAWING 1

44

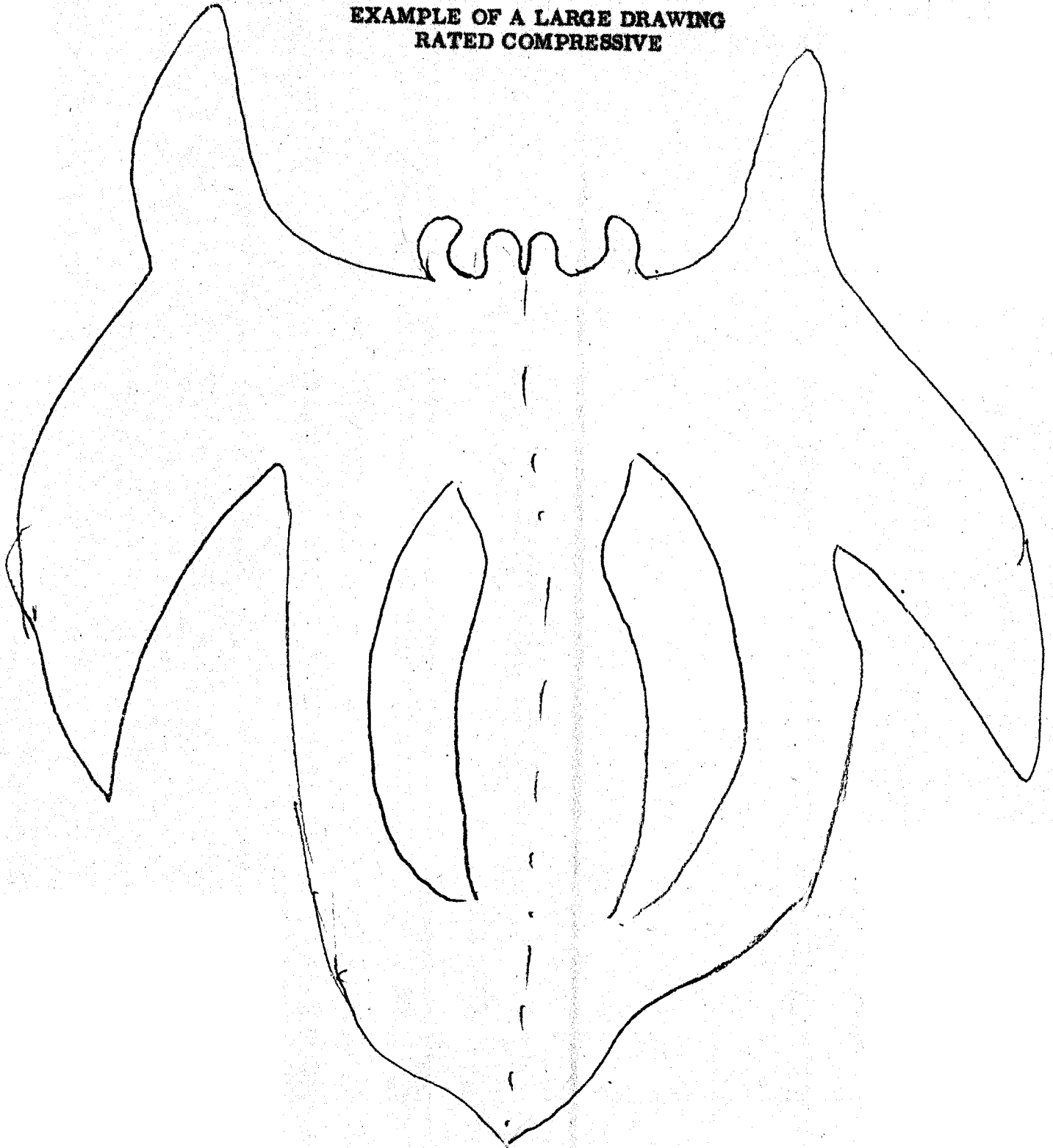
**EXAMPLE OF A SMALL DRAWING RATED COMPRESSIVE**



**DRAWING 2**

**45**

**EXAMPLE OF A LARGE DRAWING  
RATED COMPRESSIVE**

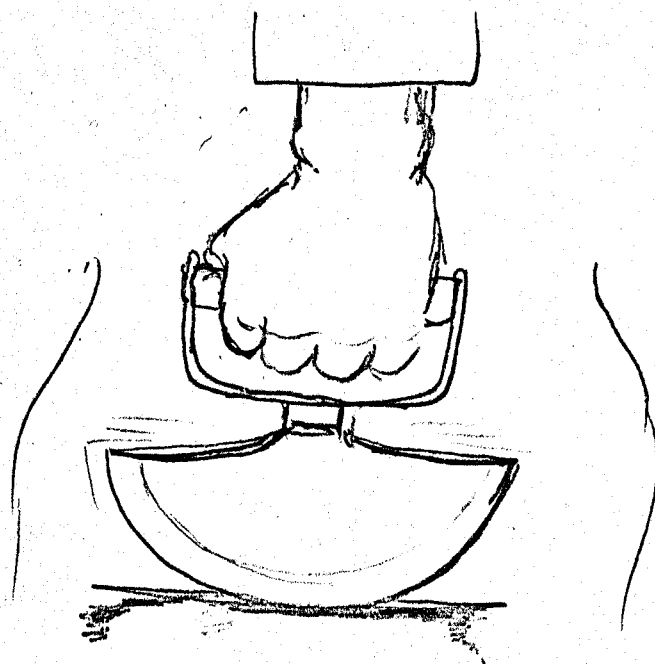


#6

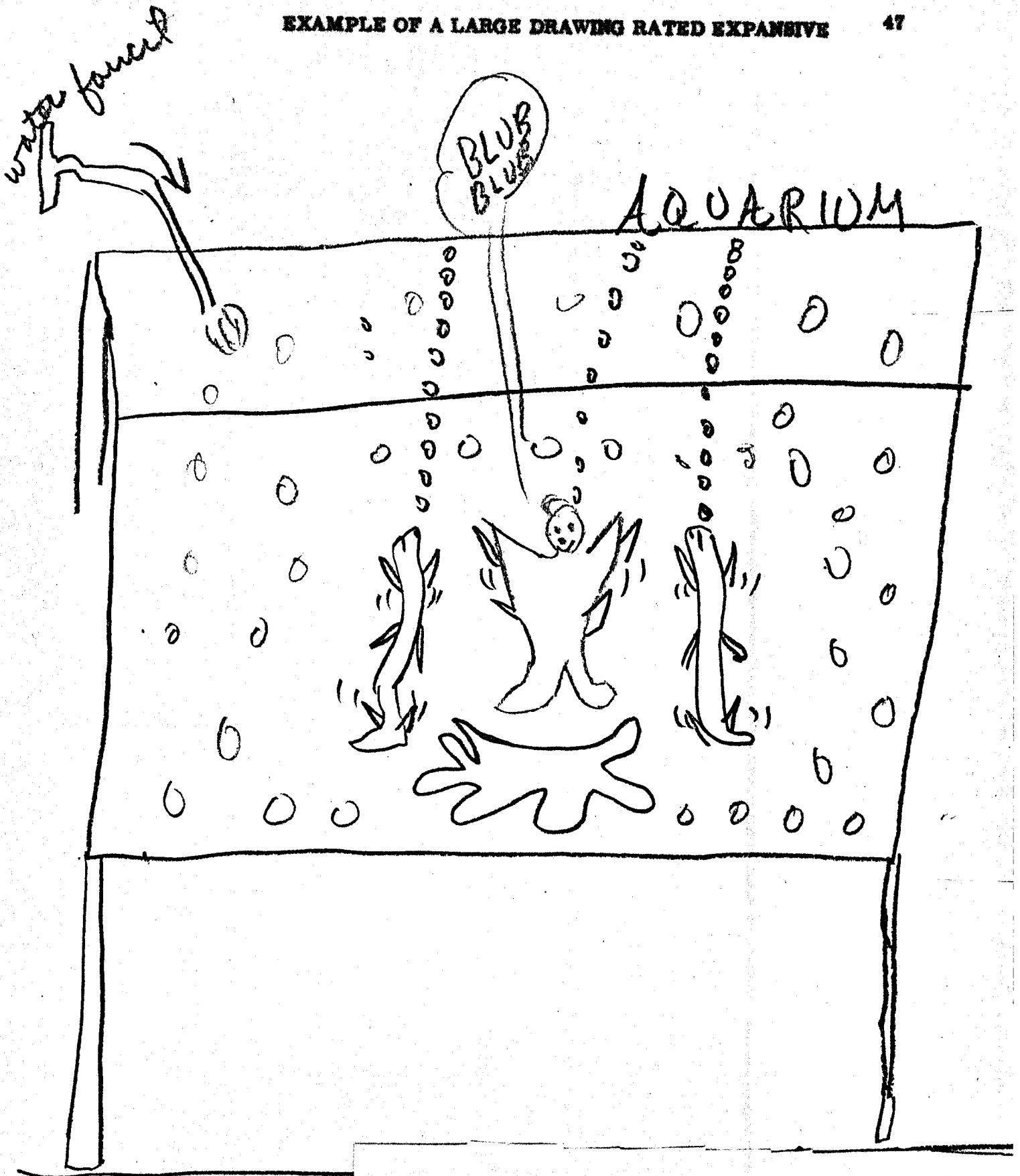
46

**DRAWING 3**

**EXAMPLE OF A SMALL DRAWING RATED EXPANSIVE**







# APPENDIX B

## TABLE 8

### TEN SEMANTIC DIFFERENTIAL SCALES FOR THE MEASUREMENT OF EXTRA-VERSION - INTROVERSION

Intensity: scoring	3	2	1	0	1	2	3	Direction: scoring
	7	6	5	4	3	2	1	
	good							bad
	wise							foolish
	successful							unsuccessful
	strong							weak
	spacious							constricted
	tenacious							yielding
	active							passive
	fast							slow
	relaxed							tense
	aggressive							defensive

**TABLE 7**  
**SEMANTIC DIFFERENTIAL FACTOR SCORES FOR DIRECTION**

Evaluation		Potency		Activity	
Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)	Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)	Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)
90	83	87	84	109	80
89	74	77	81	84	76
76	72	76	76	78	74
72	69	76	76	76	73
69	67	76	75	76	72
68	66	76	73	71	71
67	65	75	72	68	70
67	64	72	70	67	70
67	64	70	70	67	69
64	64	69	69	67	69
64	64	69	69	66	69
60	62	66	68	64	68
57	61	61	68	60	67
57	59	59	68	60	67
56	59	52	67	51	67
54	57	51	65	48	67
51	54	48	65	48	66
1128	53	1160	64	1159	64
	53		63		63
	53		62		61
	52		62		60
	48		61		57
	47		60		57
	1600		58		54
			56		51
			40		49
			1748		1711
<b>Means:</b>					
66.117	61.538	68.235	67.230	68.176	65.807

**TABLE 8**  
**SEMANTIC DIFFERENTIAL FACTOR SCORES FOR INTENSITY**

<b>Evaluation</b>		<b>Potency</b>		<b>Activity</b>	
Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)	Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)	Scores for subjects rated Expansive (N=17)	Scores for subjects rated Compressive (N=26)
37	37	39	37	38	34
36	29	38	32	38	34
34	28	34	30	38	33
28	27	34	27	35	33
27	27	33	26	34	32
27	25	31	26	32	30
26	24	30	26	32	30
25	23	29	25	32	29
24	21	29	24	31	28
23	20	29	24	30	28
23	19	24	22	30	28
20	19	22	22	29	28
19	18	22	22	26	26
18	18	21	21	26	26
17	18	20	21	25	25
17	18	17	21	21	25
16	18	16	20	19	23
417	18	468	19	516	23
	18		19		23
	14		18		22
	13		17		21
	13		16		21
	13		15		16
	11		15		15
	8		14		15
	<u>7</u>		<u>14</u>		<u>13</u>
	504		573		661
<b>Means:</b>					
24.529	19.385	27.529	22.038	30.353	25.423

TABLE 9

## ACTUAL AND PREDICTED RATINGS OF EXTRAVERSION-INTROVERSION

Actual Rating	Predicted Rating	Actual rating	Predicted rating
5.000	2.486*	1.500	1.021**
5.000	2.386*	1.500	1.016**
4.500	1.722	1.000	3.147
4.000	3.511*	1.000	1.965**
4.000	3.488*	1.000	1.789**
3.500	3.026*	1.000	1.683**
3.500	2.493*	1.000	1.618**
3.000	1.646	1.000	.431**
3.000	1.391	1.000	.253**
2.500	2.851*	.500	1.834**
2.500	2.545*	.500	1.546**
2.500	2.517*	.500	1.386**
2.500	2.025*	.500	.736**
2.500	1.612	.500	.722**
2.500	1.421	.500	.554**
2.500	1.008	0	2.670
2.500	.820	0	2.108
2.000	2.308	0	1.792**
2.000	1.581**	0	1.312**
2.000	.602**	0	.295**
1.500	1.956**		
1.500	1.760**		
1.500	1.737**		

\*Correctly predicted Extraversion ratings

\*\*Correctly predicted Introversion ratings

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## VITA AUCTORIS

- 1938 Born, December 20, in Semlin, Yugoslavia to Peter and Katherine Tines
- 1943-54 Educated at Real Gymnasium in Linz, Austria.
- 1954 Immigrated to Canada.
- 1955 Enrolled as full-time student at Assumption University of Windsor, September.
- 1959 Graduated with B.A. degree from Assumption University of Windsor.
- 1960 Enrolled as full-time graduate student at Assumption University of Windsor. Awarded a teaching assistantship in the same place.